CLAIMS

1. A method of assessment of relative changes in the cross sectional area of a limb artery, comprising:

applying to the artery an external pressure, which causes the cross-sectional area of the artery to change between systole and diastole much more than if the pressure is not applied;

determining, over one or more cardiac cycles, a baseline value for a parameter related to the cross-sectional area of the artery, while the pressure is applied;

applying a stimulus to the artery;

determining, over one or more cardiac cycles, a stimulus-affected value for the parameter related to the cross-sectional area of the artery, while the pressure is applied and while the artery is in a dilated state affected by the stimulus; and

evaluating the artery based on a comparison of the determined stimulus-affected and baseline values,

wherein the baseline value is determined while the artery is substantially not affected by the stimulus.

2. A method according to claim 1, wherein applying the stimulus comprises restricting flow of blood to the limb by occlusion a blood vessel.

3. A method according to claim 2, wherein restricting the flow of blood and applying the pressure on the artery are performed using separate cuffs.

4. A method according to claim 2, wherein a same cuff is used to occlude the blood vessel and to apply the pressure on the artery.

5. A method according to claim 2, wherein restricting flow of blood through the artery comprises restricting for at least 3 minutes.

6. A method according to claim 1, wherein applying the stimulus comprises administering a drug to the patient.

7. A method according to claim 1, wherein the baseline value is determined before applying the stimulus.

8. A method according to claim 1, wherein the baseline value is determined after applying the stimulus.

9. A method according to claim 1, wherein applying the pressure to the artery comprises applying a local pressure which does not substantially affect other blood vessels in a same limb as the artery.

10. A method according to claim 1, wherein applying the external pressure to the artery comprises applying a pressure which affects an entire cross-section of a limb including the artery.

11. A method according to claim 1, wherein applying the external pressure to the artery comprises applying a pressure between the diastole and systole pressure levels of the patient, such that the artery collapses in diastole and recuperates in systole.

12. A method according to claim 11, wherein applying the pressure to the artery comprises applying a pressure substantially equal to the mean artery pressure of the artery.

13. A method according to claim 1, wherein applying the pressure to the artery comprises applying a plurality of different pressure levels and wherein determining the parameter value comprises determining the parameter value for a plurality of different pressure levels.

14. A method according to claim 13, wherein applying the plurality of different pressure levels comprises applying a continuously changing pressure.

15. A method according to claim 14, wherein applying a continuously changing pressure comprises estimating a mean artery pressure MAP level, applying a pressure above the estimated MAP level by a predetermined amount and allowing the pressure to reduce continuously toward a pressure below estimated MAP level.

16. A method according to claim 15, wherein allowing the pressure to change comprises allowing the pressure to change until the measurements of the parameter fulfill a desired condition.

17. A method according to claim 15, wherein allowing the pressure to change comprises allowing the pressure to change until the measurements of the parameter pass their maximum.

18. A method according to claim 15, wherein allowing the pressure to change comprises allowing the pressure to change until a predetermined pressure level is reached.

19. A method according to claim 1, wherein determining the parameter value comprises determining a bio-impedance.

20. A method according to claim 1, wherein determining the parameter value comprises determining a pressure change.

21. A method according to claim 1, wherein evaluating the artery comprises providing a score indicative of the endothelial function of the artery.

22. A method according to claim 21, wherein the score is additionally a function of at least one patient attribute.

23. A method according to claim 1, wherein evaluating the artery comprises calculating a change in the cross-sectional area of the artery over a single stimulus-affected cardiac cycle and a single baseline cardiac cycle, responsive to the determination of the stimulus-affected and baseline values, and comparing the calculated changes of the stimulus affected cardiac cycle and of the baseline cycle.

24. A method according to claim 23, wherein calculating the change in the cross-sectional area of the artery comprises selecting a single cardiac cycle from the one or more cardiac cycles for which the parameter value was determined and calculating the change for the selected cardiac cycle.

25. A method according to claim 24, wherein selecting the single cardiac cycle comprises selecting a cycle having a maximal change in the parameter value.

26. A method according to claim 23, wherein calculating the change in the cross-sectional area of the artery comprises reconstructing an envelope of the maximal and minimal cross-sectional areas of the artery and finding a maximum from the envelope.

27. A method according to claim 1, wherein determining the stimulus affected value for the parameter in the dilated state comprises determining a plurality of values in a plurality of rounds separated by rest intervals in which substantial pressure is not applied to the artery.

28. A method according to claim 27, wherein determining the stimulus affected value for the parameter in the dilated state comprises determining a maximum for the plurality of values determined in the plurality of rounds.

29. A method according to claim 27, wherein determining the plurality of values in the plurality of rounds comprises determining in rounds at predetermined times after the applying of the stimulus.

30. Apparatus for assessment of relative changes in the cross sectional area of a limb artery, comprising:

a measurement cuff adapted to apply a pressure to an artery;

a measurement unit adapted to determine, over one or more cardiac cycles, a value for a parameter related to the cross-sectional area of the artery, while the pressure is applied;

a controller adapted to apply to the cuff a pressure that causes the cross-sectional area of the artery to change between systole and diastole much more than if the pressure is not applied, to induce at least two measurement rounds of the parameter by the measurement unit while the pressure is applied; and

a processor adapted to compare the values determined by the measurement unit in the at least two measurement rounds.

31. Apparatus according to claim 30, wherein the measurement cuff includes a hydraulic or pneumatic pump adapted to apply the pressure.

32. Apparatus according to claim 30, wherein the measurement cuff includes a motor adapted to pull a strap that applies the pressure.

33. Apparatus according to claim 30, wherein the processor is further adapted to determine a blood pressure, responsive to parameter values determined by the measurement unit.

34. Apparatus according to claim 30, wherein the cuff is adapted to apply the pressure substantially around an entire circumference of a limb including the artery.

35. Apparatus according to claim 30, wherein the measurement cuff is adapted to apply a local pressure which does not substantially affect other blood vessels in a same limb as the artery.

36. Apparatus according to claim 30, wherein the measurement unit is adapted to measure a bio-impedance.

37. Apparatus according to claim 36, wherein the measurement unit includes disposable electrodes.

38. Apparatus according to claim 30, wherein the controller is adapted to induce at least one of the measurement rounds responsive to an indication that a stimulus was administered to the artery and at least one of the measurement rounds before the indication that the stimulus was administered to the artery is received.

39. Apparatus according to claim 30, wherein the controller is adapted to apply the pressure continuously over at least five cardiac cycles of the patient.

40. Apparatus according to claim 30, wherein the controller is adapted to apply a pressure between the diastole and systole pressure levels of the artery such that the artery collapses in diastole and recuperates in systole.

41. Apparatus according to claim 30, wherein the controller is adapted to apply a pressure substantially equal to the mean artery pressure of the artery.

42. Apparatus according to claim 30, wherein the controller is adapted to apply a plurality of different pressure levels during a single measurement round.

43. Apparatus according to claim 42, wherein the controller is adapted to apply a continuously changing pressure.

44. Apparatus according to claim 30, wherein the processor is adapted to calculate a change in the cross-sectional area of the artery over a single cardiac cycle of each of the measurement rounds and to compare the calculated changes of the measurement rounds.

45. Apparatus according to claim 44, wherein the processor is adapted to select, for each measurement round, a single cardiac cycle from the one or more cardiac cycles for which the parameter value was determined and to calculate the change for the selected cardiac cycle.

46. Apparatus according to claim 30, wherein the processor is adapted to estimate an envelope of the measured parameter values and find a maximal parameter value difference from the envelope.

47. Apparatus according to claim 30, wherein the measurement cuff or parts thereof are disposable.

48. Apparatus for assessment of artery operation, comprising:

a cuff for applying pressure to an artery;

a bio-impedance sensing unit for determining the impedance of a portion of a limb including the artery; and

a controller adapted to apply pressure to the cuff and to measure an impedance through the sensing unit, substantially concurrently.

49. Apparatus according to claim 48, wherein the bio-impedance sensing unit comprises four electrodes.

50. Apparatus according to claim 48, wherein the bio-impedance sensing unit comprises an alternating current source and a measurement unit for alternating voltage.

51. Apparatus according to claim 48, wherein the controller is adapted to calculate an endothelial functioning score, responsive to the impedance measurements.

52. Apparatus according to claim 48, wherein the controller is adapted to determine a blood pressure of the patient responsive to the impedance measurements.

53. A method of assessment of blood pressure, comprising:

placing a bio-impedance probe above an artery of a patient;

measuring impedance values through the bio-impedance probe; and

determining the blood pressure of the patient responsive to the measured impedance values.

54. A method according to claim 53, comprising applying pressure to the artery while the impedance values are measured.

55. A method according to claim 54, wherein the applied pressure changes between a level above systole and a level below diastole.